Appendix H

Ken Sturm/USFWS

Sundew (Drosera sp.) species of concern

Economic Impacts of Each Alternative

Introduction

The National Wildlife Refuge System Improvement Act of 1997 requires all units of the National Wildlife Refuge System to be managed under a Comprehensive Conservation Plan (CCP). The CCP must describe the desired future conditions of a refuge and provide long range guidance and management direction to achieve refuge purposes. Canaan Valley National Wildlife Refuge (refuge), located in Tucker County, West Virginia is in the process of developing a range of management goals, objectives, and strategies for the CCP. The CCP for the refuge must contain an analysis of expected effects associated with current and proposed refuge management strategies.

For refuge CCP planning, an economic analysis provides a means of estimating how current management (No Action alternative) and proposed management activities affect the local economy. This type of analysis provides two critical pieces of information: 1) it illustrates a refuge's contribution to the local community; and 2) it can help in determining whether economic effects are or are not a real concern in choosing among management alternatives.

It is important to note that the economic value of a refuge encompasses more than just the impacts of the regional economy. Refuges also provide substantial nonmarket values (values for items not exchanged in established markets) such as maintaining endangered species, preserving wetlands, educating future generations, and adding stability to the ecosystem (Carver and Caudill, 2007). However, quantifying these types of nonmarket values is beyond the scope of this study.

This report first presents a description of the local community and economy near the refuge. Next, the methods used to conduct a regional economic impact analysis are described. An analysis of the final CCP management strategies that could affect stakeholders and residents and the local economy is then presented. The refuge management activities of economic concern in this analysis are:

- Refuge purchases of goods and services within the local community.
- Refuge personnel salary spending.
- Spending in the local community by refuge visitors.
- Revenues generated from Refuge Revenue Sharing.

Regional Economic Setting

The Canaan Valley region is a unique mountain valley, with habitats, plants and animals typically found at higher latitudes. The refuge works to preserve the unique wetlands and uplands of this high elevation, moist valley (USDOI, 2008). Canaan Valley refuge is located in Tucker County, West Virginia, in the northeastern portion of the state known as the Potomac Highlands Region. In 1994, with the purchase of 86 acres, Canaan Valley refuge became the nation's 500th refuge. Currently, the refuge consists of over 16,000 acres. Additionally, close to 10,000 acres remain within its acquisition boundary. The acquisition boundary encompasses most of the wetlands and unique habitats of the valley. Acquisition will continue, dependent on willing sellers and availability of funds.

The refuge is within a few hours drive of several large metropolitan areas including Pittsburgh and Harrisburg, Pennsylvania, Washington, D.C., Baltimore, MD and Charlottesville and Richmond, Virginia (Tucker County Convention and Visitors Bureau, 2008). For the purposes of an economic impact analysis, a region (and its economy) is typically defined as all counties within a 30–60 mile radius of the impact area. Only spending that takes place within this local area is included as stimulating changes in economic activity. The size of the region influences both the amount of spending captured and the multiplier effects. While the refuge is located in Tucker County, the city of Elkins (located in adjacent Randolph County) is economically important to the refuge as well. Most of the refuge personnel live and approximately twenty five percent of the refuge non-salary purchases are made in Elkins. Randolph County is the largest county in West Virginia with a total area of 1,040 square miles (U.S. Census Bureau, 2008). Elkins is located in northern tip of Randolph County, 34 miles southwest of the refuge. The refuge's economic ties to Randolph County do not extend past Elkins. Based

on the relative self-containment in terms of retail trade, Tucker County and the city of Elkins were assumed to comprise the local economic region for this analysis.

Population

Table H.1 shows the population estimates and trends for the regional area and communities near the refuge. In 2000, the city of Elkins and Tucker County were similar in terms of population size with 7,032 residents in Elkins and only a few hundred more (7,321) in Tucker County (U.S. Census Bureau, 2008). Davis, Thomas and Parsons are the principal communities in Tucker County located near the refuge. In 2000, Tucker County was the third least populated county in the state and accounted for less than one percent of the state's total population (U.S. Census Bureau, 2008). The town of Parsons was the only community that resembled the state's 0.8% population growth rate, with a 0.7% population increase from 1990-2000 (U.S. Census Bureau, 2008). Elkins and Tucker County experienced population declines of approximately 5% between 1990-2000 while the smaller communities of Davis and Thomas experienced larger declines of over 21% (U.S. Census Bureau, 2008).

Table H.1. Local and regional population estimates and characteristics.

	Population in 2000			Population change
	Residents	Persons per square mile	Median age	1990 to 2000
West Virginia	1,808,344	75.1	38.9	+0.8%
Tucker County	7,321	17.5	42.0	-5.3%
Communities near refuge				
Elkins (Randolph County)	7,032	2,207.7	38.8	-5.5%
Davis (Tucker County)	624	546.0	41.5	-21.9%
Thomas (Tucker County)	452	753.6	47.8	-21.1%
Parsons (Tucker County)	1,463	1,332.5	39.9	+0.7%

Source: U.S. Census Bureau (2008), Census 2000 Summary File (SF-1)

The city of Elkins is located in the heart of West Virginia's Mountain Highlands and serves as the recreation gateway community to the Monongahela National Forest with nearby access to the refuge, state parks, forests and natural landmarks (City of Elkins, 2008). Situated on a bend in the Tygart Valley River, Elkins was founded by Senators Henry Gassaway Davis and Stephen B. Elkins in 1890 and became the Randolph county seat in 1899 (City of Elkins, 2008). Historically, the area was dominated by agriculture (West Virginia Rails-to-Trails Council, 2002). The senators were responsible for bringing the WV Central and Pittsburgh Railway into Elkins which opened the surrounding territory to development (City of Elkins, 2008). The completion of the railway in the late 1890's, made extraction of the large reserves of coal, limestone, shale, and timber resources possible and encouraged industrial development of the area (West Virginia Rails-to-Trails Council, 2002).

Approximately 41% of Tucker County, known as the "Top of the Mountain State," is publicly owned land. Parsons, the county seat, is located on Shaver's Fork of the Cheat River and is home to 1,463 residents. The town was incorporated in 1893 and named for Ward Parsons, a pioneer who owned the land on which the town was built (West Virginia Rails-to-Trails Council, 2002). Davis, the highest incorporated town in the state at an elevation of 3,200, consists of 624 residents. The town has a longstanding tradition with the lumber industry, known in its early years as "Canada," consisting of a dense forest of spruce and hardwoods (Town of Davis, West Virginia, 2006). Thomas, home to 452 residents is only 2.5 miles from Davis. Like many towns in the region, Thomas has its roots in the coal industry. By 1892, Davis Coal and Coke was one of the largest in the world, employing 1,600 people in Thomas (Tucker County Convention and Visitors Bureau, 2006).
The Census Bureau (2008) reports that in 2000, West Virginia's population consisted of 95% white persons not of Hispanic or Latino origin. Tucker County (98.9%), and the communities of Elkins (96.9%), Davis (97.9%), Thomas (98.7%) and Parsons (99%) all had averages greater than the state average in 2000. The percentage of residents identifying themselves as Black or African American, American Indian or Native Alaskan, and

Asian was 2.2% in Elkins and less than 0.5% in Tucker County (U.S. Census Bureau, 2008). Ancestry patterns across Elkins, Davis, Thomas and Parsons were similar to each other with heavy German, Irish and English influences (U.S. Census Bureau, 2008).

Approximately 71.5% of West Virginia residents 25 years and older are high school graduates. Tucker County (75.4%) and the communities of Elkins (79.5%), Davis (76.7%), Thomas (84.5%) and Parsons (77.4%) all displayed rates greater than the state average. In 2000, the percentage of residents who held a bachelor or advanced degree was 14.8% for the state of West Virginia while the national average was 24.4% (U.S. Census Bureau, 2008). Elkins (23.4%) exceeded to state average while Tucker County (10.5%) and the communities of Davis (9.4%), Thomas (10.1%), and Parsons (11.8%). were all less then the state average (U.S. Census Bureau, 2008).

Employment and Income

Employment estimates (2006) for Elkins, Tucker County and the state of West Virginia are shown in Table H.2. Generally, Elkins and Tucker County resembled the state's percentage of employment in each industry. Two main differences were the employment in the accommodation and food industry in Tucker County was almost 10% higher than the state average and Elkins employment in educational, health and social services industries was over 14% higher than the state average. Government employment accounted for almost 17% of West Virginia's total employment in 2006, a greater percentage than any other sector. Government was also the largest employer in Tucker County and the second largest employer in Elkins in 2006. In 2006, construction, manufacturing, retail trade and the finance, insurance, real estate and information industries were other main industries providing employment in Tucker County. Other main industries providing employment in Elkins in 2006 were retail trade and the arts, entertainment, recreation, accommodation and food services (U.S. Census, 2008).

Table H.2. 2006 Full-time and part-time employment for West Virginia, Tucker County, and Elkins.

	West Virginia	Tucker County	Elkins**
Total non-farm employment (jobs)	860,554	3,697	5,791
Percent of Employment by Industry			
Ag, forestry, fish & hunting	0.5%	(D)*	2.5%
Mining & Utilities	4.4%	(D)*	--**
Construction	6.6%	8.1%	5.3%
Manufacturing	7.1%	8.2%	10%
Wholesale trade	3.1%	(D)*	3%
Transportation & warehousing	3.0%	2.8%	2.7%
Retail trade	12.7%	10.4%	11%
Finance, insurance, real estate, & information	7.4%	7.6%	5.6%
Services			
Professional, management, admin., & waste	9.4%	(D)*	8.2%
Health care, social assistance, & educational	14.0%	11.1%	28.6%
Arts, entertainment, & recreation	1.9%	1.3%	--**
Accommodation & food	7.1%	17.0%	10.2%
Other services	6.2%	7.0%	4.9%
Government (federal, state, & local)	16.8%	19.0%	17.8%

Source: State and County level data from U.S. Dept. of Commerce, Bureau of Economic Analysis, Regional Economic Information System 2008. Self-employment is not included.

(D): Not shown to avoid disclosure of confidential information, but the estimates for these items are included in the totals*

***Elkins data from U.S. Census (2008), Arts, Entertainment & recreation included in Accommodation and food, Mining was not reported*

U.S Census Bureau (2008) data for median household income, unemployment and percentage of persons living below poverty are shown in Table H.3. As shown in Table H.3, Tucker County and all the communities included in the study area were below the state and national averages for median household income. The national average unemployment rate in 2000 was 3.7%, and West Virginia's average unemployment rate was 4.0% in the same year. Thomas (3.6%) was the only community in the study area with an unemployment rate lower than the state and national averages. The percent of population below the federal poverty line is an indicator of the economic distress within a community. In 1999, the national average of individuals living in poverty was 12.4%. West Virginia's average was 17.9%. Tucker County (18.1%) exceeded both the state and national averages. Elkins (14.4%), Davis (14.6%) and Thomas (13.7%) were greater than the national average, but less than the county and state averages. Parsons (18.7%) has the greatest percentage of its residents living below poverty of the towns in the study area (U.S. Census Bureau, 2008). (Table H.3)

Table H.3. Income, unemployment, and poverty estimates.

	Median Household Income (1999)	Percent Unemployed (2000)	Percent of Persons below Poverty (1999)
United States Average	$41,994	3.7%	12.4%
West Virginia	$29,696	4.0%	17.9%
Tucker County	$26,250	4.2%	18.1%
Elkins (Randolph County)	$26,906	4.7%	14.4%
Communities near refuge			
Davis (Tucker County)	$25,221	5.2%	14.6%
Thomas (Tucker County)	$22,443	3.6%	13.7%
Parsons (Tucker County)	$26,424	4.3%	18.7%

Source: U.S. Census Bureau (2008)

Recreation and Tourism

The travel and tourism industry continues to be a significant and growing contributor to the West Virginia economy. According to recent report on the economic impact of travel on West Virginia, travel-generated spending totaled over $3.97 billion, supporting 44,000 jobs with $854 million in earnings (Dean Runyan Associates, 2007). According to the report, travel spending in West Virginia increased by 8.8% per year from 2000 to 2006. In 2006, travel generated earnings accounted for 12.4% of total earnings in Tucker County and 1.6% of total earnings in Randolph County while travel generated employment accounted for 19.1% of total employment in Tucker County and 3.4% of total employment in Randolph County (Dean Runyan Associates, 2007).

With many acres of public land, including the refuge, the Monongahela National Forest, and Blackwater Falls and Canaan Valley Resort State Parks, Tucker County and the greater Canaan Valley offer numerous outdoor recreation activities. Popular activities include hunting, camping, mountain biking, fishing, whitewater rafting and canoeing. Winter recreation activities are another major attraction in Tucker County with Canaan Valley Resort State Park and Timberline Resort for downhill skiing, and White Grass Resort for cross country skiing and snowshoeing. On average, the resorts receive between 150-200 inches of snowfall each year. (Tucker County Convention and Visitors Bureau, 2006). Details about the economic contributions associated with wildlife viewing, fishing, and hunting in West Virginia are provided below.

Wildlife Viewing

Abundant opportunities are available throughout West Virginia for formal wildlife education or recreational viewing. Wildlife viewing can include the activities of observing, identifying, photographing. The 2006 National Survey of Fishing, Hunting, and Wildlife Associated Recreation (FHWAR) asks respondents about wildlife viewing around their homes and trips taken for the primary purpose of wildlife watching (USDOI et al 2007). In 2006, there were a total of 743,000 wildlife watching participants (residents and nonresidents) in West

Virginia with over 4 million days of participation away from home. Spending associated with wildlife watching in West Virginia totaled $241.6 million in 2006; of which 56% ($136.1 million) were trip related expenditures and 44% ($105.5 million) were spent on equipment and other expenses (USDOI et al. 2007).

According to a U.S. Fish and Wildlife Service (Service) report on the national and state economic impacts of wildlife watching (USDOI & USFWS 2003) accounting for the multiplier effect, spending by resident and nonresident wildlife watchers in West Virginia in 2001 generated; $252.5 million in output, $74.7 million in wages, 3,946 jobs, and $6.4 million in state sales tax revenue. This accounted for 0.5% of total employment and 0.4% of employment income in West Virginia (USDOI et al. 2003).

Hunting

The FHWAR indicates that hunting participation in the U.S. declined from 14.1 million in 1991 to 13 million in 2005 (USDOI & USFWS 2007). Data from the 1991, 1996, 2001, and 2006 FHWAR indicate that the declines were attributable to declines in both recruitment of new participants and retention of former participants. According to Curtis Taylor, chief of the Wildlife Resources Section of the West Virginia Division of Natural Resources, hunting numbers in West Virginia have stayed fairly consistent and are not following the declining national trend (Darst, 2008). Hunting on the refuge has stayed consistent as well with an average of 1,837 hunting permits issued annually.

In 2006, there were a total of 269,000 resident and non resident hunters in West Virginia. Residents of West Virginia accounted for 72% of total hunters and 86% of the 3.9 million days of hunting in West Virginia (USDOI et al. 2007). According to USDOI and others (2007), hunting related expenditures by state residents and nonresidents in West Virginia totaled $284.5 million in 2006; of which 28% ($79.4 million) were trip related expenditures and 72% ($205.1 million) were spent on equipment and other hunting-related expenses (i.e., membership dues, licenses, and land leasing). According to a report by Southwick Associates (2007a) accounting for the multiplier effect, spending by resident and nonresident hunters in West Virginia generated; $453.5 million in output, $133.2 million in income, 6,337 jobs, and $29.6 million in state and local sales taxes in 2006.

Fishing

The FHWAR indicates that fishing participation in the U.S. declined from 35.6 million in 1991 to 34.1 million in 2005 (USDOI et al. 2007). Similar to hunting, the FHWAR data indicate that the declines were attributable to declines in both recruitment of new participants and retention of former participants.

In 2006, more than 376,000 people in West Virginia participated in freshwater fishing. West Virginia residents accounted for 77% of total freshwater anglers and 94% of the 6.9 million days of freshwater fishing in West Virginia (USDOI et al. 2007). Direct spending in West Virginia by state resident and nonresident freshwater anglers totaled $334 million in 2006; of which 46% ($154 million) were trip related expenditures and 54% ($180 million) were spent on equipment and other expenses (USDOI et al. 2007). According to a report by Southwick Associates (2007b) accounting for the multiplier effect, spending by resident and nonresident anglers in West Virginia generated; $485.3 million in output, $137.9 million in income, 6,617 jobs, and $29.2 million in state and local sales taxes in 2006.

Economic Impacts of Current and Proposed Management Activities

Methods for a Regional Economic Impact Analysis

Economic input-output models are commonly used to determine how economic sectors will and will not be affected by demographic, economic, and policy changes. The economic impacts of the management alternatives for Canaan Valley refuge were estimated using IMPLAN (Impact Analysis for Planning), a regional input-output modeling system developed by the U.S. Department of Agriculture Forest Service. IMPLAN is a computerized database and modeling system that provides a regional input-output analysis of economic activity in terms of 10 industrial groups involving more than five hundred economic sectors (Olson and Lindall, 1999). The IMPLAN model draws upon data collected by the Minnesota IMPLAN Group from multiple federal and state sources including the Bureau of Economic Analysis, Bureau of Labor Statistics, and the U.S. Census

Bureau (Olson and Lindall, 1999). The year 2006 IMPLAN Tucker County data profile and the Elkins area zip code data profiles (26241 and 26276, and 26283) were used in this study. The IMPLAN county level employment data estimates were found to be comparable to the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System data for the year 2006.
Because of the way industries interact in an economy, a change in the activity of one industry affects activity levels in several other industries. For example, if more visitors come to an area, local businesses will purchase extra labor and supplies to meet the increase in demand for additional services. The income and employment resulting from visitor purchases from local businesses represent the direct effects of visitor spending within the economy. Direct effects measure the net amount of spending that stays in the local economy after the first round of spending, the amount that doesn't stay in the local economy is termed a leakage (Carver and Caudill, 2007). In order to increase supplies to local businesses, input suppliers must also increase their purchases of inputs from other industries. The income and employment resulting from these secondary purchases by input suppliers are the indirect effects of visitor spending within the county. The input suppliers' new employees use their incomes to purchase goods and services. The resulting increased economic activity from new employee income is the induced effect of visitor spending. The indirect and induced effects are known as the secondary effects of visitor spending. Multipliers capture the size of the secondary effects, usually as a ratio of total effects to direct effects (Stynes, 1998). The sums of the direct and secondary effects describe the total economic impact of visitor spending in the local economy.

For each alternative, regional economic effects from the IMPLAN model are reported for the following categories:

- **Local Output** represents the change in local sales or revenue.
- **Personal Income** represents the change in employee income in the region that is generated from a change in regional output.
- **Employment** represents the change in number of jobs generated in the region from a change in regional output. IMPLAN estimates for employment include both full time and part time workers, which are measured in total jobs.

There are four alternatives evaluated in the final CCP. Alternative A satisfies the National Environmental Policy Act requirement of a "no action" alternative, which we define as "continuing current management." It describes the refuge's existing management priorities and activities, and serves as a baseline for comparing and contrasting alternatives B, C and D. Alternative B, the Service-preferred alternative, combines the actions that the refuge believes would most effectively achieve refuge purposes, vision and goals, and respond to public issues. It emphasizes management of specific refuge habitats to support focal species whose habitat needs benefit other species of conservation concern. Alternative C puts most management emphasis on the focal species which respond to early successional habitat management. Differences between alternatives are more distinct within the public use goals and objectives. Alternative D emphasizes management to restore where practicable, the distribution of natural communities in the Canaan Valley that would have resulted from natural processes without the influence or intervention of human settlement and management.

The CCP provides long range guidance and management direction to achieve refuge purposes over a 15 year timeframe. The economic impacts reported in this report are on an annual basis in 2006 dollars. Large management changes often take several years to achieve. The estimates reported for alternatives B, C, and D represent the final economic effects after all changes in management have been implemented.

Economic Impacts of Alternative A

Impacts from Refuge Revenue Sharing

Under provisions of the Refuge Revenue Sharing (RRS) Act, local counties receive an annual payment for lands that have been purchased by full fee simple acquisition by the Service. Payments are based on the greater of 75 cents per acre or 0.75% of the fair market value of lands acquired by the Service. The exact amount of the annual payment depends on Congressional appropriations, which in recent years have tended to be less than

the amount to fully fund the authorized level of payments. In fiscal year 2005 (FY05), actual RRS payments were 41% of authorized levels. This was the lowest RRS payment year, since FY05 payment levels have continually increased. However, in order to provide a conservative estimate, the FY05 authorized 41% payment level was used in analyzing the economic impacts of CCP alternatives. In 2005, Tucker County received a RRS payment of $85,247. Table H.4 shows the resulting economic impacts of RRS payments under alternative A. Accounting for both the direct and secondary effects, RRS payments for alternative A generate total annual economic impacts of $103,100 in local output, $33,000 in personal income, and 1.2 jobs in the local impact area.

Table H.4. Annual impacts from Refuge Revenue Sharing Payments for Alternative A (2005$).

	Local output	Personal income	Employment (# jobs)
Direct effects	$85,300	$28,400	1.0
Secondary effects	$17,800	$5,500	0.2
Total economic impact	$103,100	$33,900	1.2

Impacts from Public Use and Access Management

Refuge Visitor Expenditures in Local Economy

Spending associated with recreational visits to national wildlife refuges generates significant economic activity. The U.S. Fish and Wildlife Service report Banking on Nature: The Economic Benefits of National Wildlife Refuges Visitation to Local Communities estimated the impact of national wildlife refuges on their local economies (Carver and Caudill, 2007). According to the report, more than 34.8 million visits were made to national wildlife refuges in FY 2006 which generated $1.7 billion of sales in regional economies. Accounting for both the direct and secondary effects, spending by national wildlife visitors generated nearly 27,000 jobs, and over $542.8 million in employment income (Carver and Caudill, 2007). Approximately eighty two percent of total expenditures were from non-consumptive activities, twelve percent from fishing, and six percent from hunting (Carver and Caudill, 2007).

The refuge offers a wide variety of year round accessible recreational opportunities including big game hunting, upland game hunting, fishing, migratory game bird and waterfowl hunting, and non-consumptive wildlife viewing, education and photography opportunities. Information on state and regional trends and associated economic impacts of these recreational activities were presented in the previous section. This section focuses on the local economic impacts associated with refuge visitation. Annual refuge visitation estimates are based on several refuge statistic sources including: visitors entering the Visitor Center/Office, traffic counters, hunting permits, and general observation by refuge personnel. Annual refuge visitation estimates are on a per visit basis. Table H.5 summarizes estimated refuge visitation by type of visitor activity for alternative A.

Table H.5. Estimated annual refuge visitation by visitor activity for Alternative A.

Visitor activity	Total number of visits	Percentage of non-local visits (%)	Total number of non-local visits	Number of hours spent at refuge	Number of non-local visitor days[1]
Consumptive use					
Fishing	1,500	60%	900	4	450
Big game hunting	4,200	92%	3,864	8	3,864
Waterfowl and migratory bird hunting	430	95%	409	8	409
Upland game hunting	360	95%	342	8	342
Non-consumptive use					
Nature trails/ other wildlife observation/ office visits	31,000	70%	21,700	3	10,850
Total	37,490		27,215		15,915

[1] *One visitor day = 8 hours.*

To determine the local economic impacts of visitor spending, only spending by persons living outside the local area of Tucker County and the city of Elkins area are included in the analysis. The rational for excluding local visitor spending is twofold. First, money flowing into Tucker County and Elkins from visitors living outside the local area (hereafter referred to as non-local visitors) is considered new money injected into the local economy. Second, if residents of Tucker County and Elkins visit Canaan Valley refuge more or less due to the management changes, they will correspondingly change their spending of their money elsewhere in Tucker County and Elkins, resulting in no net change to the local economy. These are standard assumptions made in most regional economic analyses at the local level. Refuge visitation statistics and hunting permits were used to determine the percentage of non-local refuge visitors. Table H.5 shows the estimated percent of non-local refuge visits for alternative A.

A visitor usually buys a wide range of goods and services while visiting an area. Major expenditure categories include lodging, restaurants, supplies, groceries, and recreational equipment rental. In this analysis we use the average daily visitor spending profiles from the Banking on Nature report (Carver and Caudill, 2007) that were derived from the 2006 NSHFWR. The NSHFWR reports trip related spending of state residents and non residents for several different wildlife-associated recreational activities. For each recreation activity, spending is reported in the categories of lodging, food and drink, transportation, and other expenses. Carver and Caudill (2007) calculated the average per-person per-day expenditures by recreation activity for each Service region. Residents were defined as living within 30 miles of the refuge and nonresidents as living outside the 30 mile radius (Carver and Caudill, 2007). For our analysis, non-local visitors match the nonresident spending profile definition. Therefore, we used the spending profiles for nonresidents for Service Region 5 (the region Canaan Valley refuge is located in). Nonresident average daily spending profiles for big game hunting ($48.81 per-day), small game hunting ($93.79 per-day), migratory bird hunting ($107.48 per-day), and fresh water fishing ($53.34 per-day) were used to estimate non-local visitor spending for the Canaan Valley refuge hunting and fishing related activities. The average daily nonresident spending profile for non-consumptive wildlife recreation (observing, or photographing fish and wildlife) was used for non-consumptive wildlife viewing activities ($84.83 per-day).

The visitor spending profiles are estimated on an average per day (8 hours) basis. Because some visitors only spend short amounts of time on the refuge, counting each refuge visit as a full visitor day would overestimate the economic impact of refuge visitation. In order to properly account for the amount of spending, the annual number of non-local refuge visits were converted to visitor days. Refuge personnel estimate that non-local hunters spend a full visitor day (8 hours) on the refuge. Non-local visitors participating in fishing spend 4 hours (1/2 half a visitor day) while non-local visitors that view wildlife on nature trails or participate in other wildlife observation activities typically spend 3 hours (3/8 of a visitor day) on the refuge. Table H.5 shows the number of non-local visitor days by recreation activity for alternative A.

Total spending by non-local refuge visitors was determined by multiplying the average non-local visitor daily spending by the number of non-local visitor days. Table H.6 summarizes the total economic impacts associated with current non-local fishing, hunting (all types), and non-consumptive (wildlife viewing) visitation for alternative A. Non-local refuge visitors would spend over $1.21 million in Tucker County and the city of Elkins annually. This spending would directly account for $1.06 million in local output, 10.8 jobs, and $227,700 in personal income in the local economy. The secondary or multiplier effects would generate an additional $216,500 in local output, 4 jobs, and $64,800 in personal income. Accounting for both the direct and secondary effects, spending by non-local visitors for alternative A would generate total economic impacts of $1.28 million in local output, 14.6 jobs and $292,600 in personal income.

Table H.6. Annual impacts of non-local visitor spending for Alternative A (2006$).

	Local output	Personal income	Employment (# jobs)
Direct effects			
Fishing	$20,600	$4,300	0.2
Hunting	$224,600	$43,600	1.9
Wildlife viewing	$816,800	$179,900	8.7
Direct effects total	*$1,060,000*	*$227,700*	*10.8*
Secondary effects			
Fishing	$4,200	$1,300	0.1
Hunting	$41,800	$12,600	0.7
Wildlife viewing	$170,500	$51,000	3
Secondary effects total	*$216,500*	*$64,800*	*3.8*
Total effects			
Fishing	$24,800	$5,600	0.3
Hunting	$266,400	$56,200	2.6
Wildlife viewing	$987,300	$230,800	11.7
Total economic impact	**$1,278,500**	**$292,600**	**14.6**

Impacts from Refuge Administration

Staff – Personal Purchases

Employees of Canaan Valley refuge reside and spend their salaries on daily living expenses in communities near the refuge thereby generating impacts within the local economy. Household consumption expenditures consist of payments by individuals/households to industries for goods and services used for personal consumption. The IMPLAN modeling system contains household consumption spending profiles that account for average household spending patterns by income level. These profiles also capture average annual savings and allow for leakage of household spending to outside the region. The current approved refuge staff consists of nine employees for alternative A (Table H.7).

Table H.7. Current approved staff (Alternative A).

Position Title
Refuge Manager
Deputy Refuge Manager
Park Ranger
Supervisory Wildlife Biologist
Wildlife Biologist
Wildlife Biologist Term
Law Enforcement Officer
Engineering Equipment Operator
Administrative Assistant Term

Based on FY 2008 salary charts, it was estimated that annual salaries for alternative A would total over $678,000. Refuge personnel estimate that approximately 60% of their household consumption expenditures are made within the local area (Tucker County and the city of Elkins) Table H.8 shows the economic impacts associated with spending of salaries in local area by refuge employees under alternative A. For alternative A,

salary spending by refuge personnel would directly account for $402,700 in local output, 2.9 jobs, and $66,500 in personal income in the local economy. The secondary or multiplier effects would generate an additional $68,600 in local output, 1 job, and $21,300 in personal income. Accounting for both the direct and secondary effects, salary spending by refuge personnel for alternative A would generate total economic impacts of $471,300 in local output, 3.9 jobs and $87,800 in personal income.

Table H.8. Annual local economic impacts of salary spending by refuge personnel (2006$).

	Local output	Personal income	Employment (# jobs)
Direct effects	$402,700	$66,500	2.9
Secondary effects	$68,600	$21,300	1.0
Total economic impact	$471,300	$87,800	3.9

Work-related Purchases

A wide variety of supplies and services are purchased for refuge operations and maintenance activities. Refuge purchases made in Tucker County and the city of Elkins contribute to the local economic impacts associated with the refuge. According to refuge records, approximately 63% of the annual non-salary budget expenditures are spent on goods and services purchased in Tucker County and the city of Elkins. Major local expenditures include: supplies and services related to building maintenance and construction; auto repairs, parts, and fuel; and utilities. Average annual non-salary expenditures for alternative A are anticipated to be $151,000. Table H.9 shows the economic impacts associated with work related expenditures in Tucker County and the city of Elkins. For alternative A, work related expenditures would directly account for almost $72,500 in local output, 0.9 of a job, and $21,300 in personal income in the local economy. Accounting for both the direct and secondary effects, work related purchases for alternative A would generate total economic impacts of $94,900 in local output, 1.2 jobs and $28,400 in personal income.

Table H.9. Local economic impacts of refuge related purchases for Alternative A (2006$).

	Local output	Personal income	Employment (# jobs)
Direct effects	$72,500	$21,300	0.9
Secondary effects	$22,400	$7,100	0.3
Total economic impact	$94,900	$28,400	1.2

Summary of Economic Impacts for Alternative A

Table H.10 summarizes the direct and total economic impacts of all refuge management activities for alternative A in Tucker County and the city of Elkins. Under alternative A, refuge management activities directly related to all refuge operations generate an estimated $1.62 million in local output, 15.6 jobs and $344,600 in personal income in the local economy. Including direct, indirect, and induced effects, all refuge activities would generate total economic impacts of $1.95 million in local output, 20.9 jobs and $442,700 in personal income. In 2006, total personal income was estimated at $666.3 million and total employment was estimated at 9,488 jobs for Tucker County and the city of Elkins (U.S. Department of Commerce, 2008, IMPLAN 2006 data). Total economic impacts associated with refuge operations under alternative A represent less than one percent of total income (0.1%) and total employment (0.2%) in the overall Tucker County and the city of Elkins economy. Total economic effects of refuge operations play a much larger role in the Canaan Valley communities near the refuge such as Davis, Thomas and Parsons where most of the refuge public use-related economic activity occurs.

Table H.10. Economic impacts of all refuge management activities for Alternative A (2006$).

	Local output	Personal income	Employment (# jobs)
Refuge revenue sharing			
Direct effects	$85,300	$28,400	1
Total effects	$103,100	$33,900	1.2
Refuge administration (staff salary spending and work related purchases)			
Direct effects	$475,200	$87,800	3.8
Total effects	$566,200	$116,200	5.1
Public use activities			
Direct effects	$1,062,000	$227,700	10.8
Total effects	$1,278,500	$292,600	14.6
Aggregate impacts			
Direct effects	$1,622,500	$344,000	15.6
Total effects	$1,947,800	$442,700	20.9

Economic Impacts of Alternative B

Impacts from Refuge Revenue Sharing

Same as alternative A.

Impacts from Public Use and Access Management

Refuge Visitor Expenditures in Local Economy

Changes in refuge management activities can affect recreational opportunities offered and visitation levels. Table H.11 shows the estimated visitation levels associated with each visitor activity for alternative B. Under alternative B, visitation is anticipated to slightly increase for all activities compared to alternative A (Table H.5). The slight increases in visitation levels are due to modifying hunting management to allow more rifle hunting and assist hunters by establishing a remote area white-tailed deer pick-up shuttle system, officially opening the refuge to fishing, connection of some current trails, and installation of observation platforms.

Table H.11. Estimated annual refuge visitation by visitor activity for Alternative B.

Visitor activity	Total number of visits	Percentage of non-local visits (%)	Total number of non-local visits	Number of hours spent at refuge	Number of non-local visitor days[1]
Consumptive-use					
Fishing	1,575	60%	945	4	473
Big game hunting	4,410	92%	4,057	8	4,057
Waterfowl and migratory bird hunting	451	95%	428	8	428
Upland game hunting	378	95%	359	8	359
Nonconsumptive-use					
Nature trails/ other wildlife observation/ office visits	32,550	70%	22,785	4	11,393
Total	39,364		28,575		16,710

[1] *One visitor day = 8 hours.*

Table H.12 summarizes the total economic impacts associated with current non-local fishing, hunting (all types), and non-consumptive visitation for alternative B. Non-local refuge visitors would spend over $1.27 million in Tucker County and the city of Elkins annually. This spending would directly account for $1.07 million in local output, 10.9 jobs, and $230,100 in personal income in the local economy. The secondary or multiplier effects would generate an additional $218,700 in local output, 3.8 jobs, and $65,500 in personal income. Accounting for both the direct and secondary effects, spending by non-local visitors for alternative B would generate total economic impacts of $1.29 million in local output, 14.7 jobs and $295,600 in personal income.

Table H.12. Annual impacts of non-local visitor spending for Alternative B (2006$).

	Local output	Personal income	Employment (# jobs)
Direct effects			
Fishing	$21,700	$4,500	0.2
Hunting	$235,700	$45,800	2
Wildlife viewing	$816,800	$179,900	8.7
Direct effects total	$1,074,100	$230,100	10.9
Secondary effects			
Fishing	$4,400	$1,300	0.1
Hunting	$43,800	$13,200	0.7
Wildlife viewing	$170,500	$51,000	3
Secondary effects total	$218,700	$65,500	3.8
Total effects			
Fishing	$26,100	$5,800	0.3
Hunting	$279,500	$59,000	2.7
Wildlife viewing	$987,300	$230,800	11.7
Total economic impact	$1,292,900	$295,600	14.7

Impacts from Refuge Administration

Staff – Personal Purchases

Proposed staff for alternative B includes all approved staff positions (alternative A, Table H.7) plus four additional positions. The new positions are for a Refuge Operations Specialist, Visitor Services Professional, Biological Technician, and permanent Seasonal Maintenance worker. Table H.13 shows the economic impacts associated with spending of salaries in Tucker County and the city of Elkins by refuge employees under alternative B. For alternative B, salary spending by refuge personnel would directly account for $514,000 in local output, 3.7 jobs, and $84,700 in personal income in the local economy. The secondary or multiplier effects would generate an additional $87,200 in local output, 1.3 jobs, and $27,100 in personal income. Accounting for both the direct and secondary effects, salary spending by refuge personnel for alternative B would generate total economic impacts of over $601,200 in local output, 5 jobs and $111,800 in personal income. Due to the increased staffing levels for alternative B, the associated economic effects of staff salary spending would generate $129,900 more in local output, 1 more job, and $24,000 more in personal income than alternative A.

Table H.13. Local economic impacts of salary spending by refuge personnel for Alternative B (2006$).

	Local output	Personal income	Employment (# jobs)
Direct effects	$514,000	$84,700	3.7
Secondary effects	$87,200	$27,100	1.3
Total economic impact	$601,200	$111,800	5.0

Work-related Purchases

Non-salary expenditures for alternative B are anticipated to increase in proportion with the salary increase for the new staff positions for a total annual non-salary budget $200,000. Table H.14 shows the economic impacts associated with work related expenditures in Tucker County and the city of Elkins for alternative B. These estimates assume 63% of the non-salary budget will be spent on goods and services purchased in Tucker County and the city of Elkins (same as current and alternative A). Work related expenditures under alternative B would directly account for $96,000 in local output, 1.2 jobs, and $28,200 in personal income in the local economy. Accounting for both the direct and secondary effects, work related purchases for alternative B would generate a total economic impact of $125,700 in local output, 1.6 jobs and $37,600 in personal income. Due to the increased non-salary expenditures for alternative B, the associated economic effects of work related purchases would generate $30,800 more in local output, 0.4 more of a job, and $9,200 more in personal income than alternative A.

Table H.14. Local economic impacts of refuge related purchases for Alternative B (2006$).

	Local output	Personal income	Employment (# jobs)
Direct effects	$96,000	$28,200	1.2
Secondary effects	$29,700	$9,400	0.4
Total economic impact	$125,700	$37,600	1.6

Summary of Economic Impacts for Alternative B

Table H.15 summarizes the direct and total economic impacts of all refuge management activities for alternative B in Tucker County and the city of Elkins. Under alternative B, refuge management activities directly related to all refuge operations generate an estimated $1.7 million in local output, 16.8 jobs and $371,400 in personal income in the local economy. Including direct, indirect, and induced effects, all refuge activities would generate total economic impacts of $2.12 million in local output, 22.5 jobs and $478,900 in personal income. Total economic impacts associated with refuge operations under alternative B represent less than one percent of total income (0.1%) and total employment (0.2%) in the overall Tucker County and the city of Elkins economy. Total economic effects of refuge operations play a much larger role in the Canaan Valley communities near the refuge such as Davis, Thomas and Parsons where most of the refuge public use-related economic activity occurs.

Table H.15. Summary of all refuge management activities for Alternative B (2006$).

	Local output	Personal income	Employment (# jobs)
Refuge Revenue Sharing			
Direct effects	$85,300	$28,400	1
Total effects	$103,100	$33,900	1.2
Refuge administration (staff salary spending and work related purchases)			
Direct effects	$610,000	$112,900	4.9
Total effects	$726,900	$149,400	6.6
Public use activities			
Direct effects	$1,074,100	$230,100	10.9
Total effects	$1,292,900	$295,600	14.7
Aggregate impacts			
Direct effects	$1,769,400	$371,400	16.8
Total effects	$2,122,900	$478,900	22.5

Table H.16 summarizes the change in economic effects associated with refuge operations under alternative B as compared to alternative A. Due to increases in refuge administration and visitation, alternative B would generate $175,100 more in local output, 1.6 additional jobs and $36,300 more in personal income as compared to alternative A.

Table H.16. Change in economic impacts under Alternative B compared to Alternative A (2006$).

	Local output	Personal income	Employment (# jobs)
Refuge Revenue Sharing			
Direct effects	$0	$0	0
Total effects	$0	$0	0
Refuge Administration (staff salary spending and work related purchases)			
Direct effects	+$134,800	+$25,100	1.1
Total effects	+$160,700	+$33,200	1.5
Public use activities			
Direct effects	+$12,100	+$2,400	+0.1
Total effects	+$14,400	+$3,100	+0.1
Aggregate impacts			
Direct effects	+$146,900	+$27,500	1.2
Total effects	+$175,100	+$36,300	1.6

Economic Impacts of Alternative C

Impacts from Refuge Revenue Sharing

Same as alternative A.

Impacts from Public Use and Access Management

Refuge Visitor Expenditures in Local Economy

Table H.17 shows the estimated visitation levels associated with each visitor activity for alternative C. Under alternative C, slight increases in visitation are anticipated for all activities as compared to alternative A (Table H.5). The slight increases in visitation levels are due to modifying hunting management to assist hunters by establishing a remote area white-tailed deer pick-up shuttle system, officially opening the refuge to fishing, connection of some current trails (more than alternative B), and installation of observation platforms.

Table H.17. Estimated annual refuge visitation by visitor activity for Alternative C.

Visitor activity	Total number of visits	Percentage of non-local visits (%)	Total number of non-local visits	Number of hours spent at refuge	Number of non-local visitor days[1]
Consumptive use					
Fishing	1,650	60%	990	4	495
Big game hunting	4,620	92%	4,250	8	4,250
Waterfowl/migratory bird hunting	473	95%	449	8	449
Upland game hunting	396	95%	376	8	376
Non-consumptive use					
Nature trails/ other wildlife observation/ office visits	34,100	70%	23,870	4	11,935
Total	41,239		29,936		17,506

[1] *One visitor day = 8 hours.*

Table H.18 summarizes the total economic impacts associated with current non-local fishing, hunting (all types), and non-consumptive visitation for alternative C. Non-local refuge visitors would spend over 1.33 million in Tucker County and the city of Elkins annually. This spending would directly account for $1.17 million in local output, 11.9 jobs, and $250,500 in personal income in the local economy. The secondary or multiplier effects would generate an additional $238,100 in local output, 4.1 jobs, and $71,300 in personal income. Accounting for both the direct and secondary effects, spending by non-local visitors for alternative C would generate total economic impacts of $1.41 million in local output, 16 jobs and $321,800 in personal income.

Table H.18. Annual impacts of non-local visitor spending for Alternative C (2006$).

	Local output	Personal income	Employment (# jobs)
Direct effects			
Fishing	$22,700	$4,700	0.2
Hunting	$246,900	$47,900	2.1
Wildlife viewing	$898,400	$197,800	9.6
Direct effects total	$1,168,100	$250,500	11.9
Secondary effects			
Fishing	$4,600	$1,400	0.1
Hunting	$45,900	$13,800	0.7
Wildlife viewing	$187,500	$56,100	3.3
Secondary effects total	$238,100	$71,300	4.1
Total effects			
Fishing	$27,300	$6,100	0.3
Hunting	$292,900	$61,800	2.8
Wildlife viewing	$1,086,000	$253,900	12.9
Total economic impact	$1,406,200	$321,800	16.0

Impacts from Refuge Administration

Staff – Personal Purchases

Proposed staff for alternative C includes all current staff positions (alternative A, Table H.7) plus five additional positions. The new positions are: two Visitor Services Professionals; Biological Technician; Maintenance Worker; Refuge Operations Specialist. Table H.19 shows the economic impacts associated with spending of salaries in Tucker County and the city of Elkins by refuge employees under alternative C. For alternative C, salary spending by refuge personnel would directly account for $554,600 in local output, 4 jobs, and $91,400 in personal income in the local economy. The secondary or multiplier effects would generate an additional $94,100 in local output, 1.4 jobs, and $29,200 in personal income. Accounting for both the direct and secondary effects, salary spending by refuge personnel for alternative C would generate total economic impacts of $648,700 in local output, 5.4 jobs and $120,600 in personal income. Due to the increased staffing levels for alternative C, the associated economic effects of staff salary spending would generate $177,400 more in local output, 1.5 more jobs, and $32,800 more in personal income than alternative A.

Table H.19. Local economic impacts of salary spending by refuge personnel for Alternative C (2006$).

	Local output	Personal income	Employment (# jobs)
Direct effects	$554,600	$91,400	4.0
Secondary effects	$94,100	$29,200	1.4
Total economic impact	$648,700	$120,600	5.4

Work-related Purchases

Non-salary expenditures for alternative C are anticipated to increase in proportion with the salary increase for the new staff positions for a total annual non-salary budget of $250,000. Table H.20 shows the economic impacts associated with work related expenditures in Tucker County and the city of Elkins for alternative C. These estimates assume 63% of the non-salary budget will be spent on goods and services purchased in Tucker County and the city of Elkins (same as current and alternative A). Work related expenditures under alternative B would directly account for $119,900 in local output, 1.5 jobs, and $35,200 in personal income in the local economy. Accounting for both the direct and secondary effects, work related purchases for alternative B would generate a total economic impact of $157,100 in local output, 2 jobs and $47,000 in personal income. Due to the increased non-salary expenditures for alternative B, the associated economic effects of work related purchases would generate $62,200 more in local output, 0.8 more of a job, and $18,600 more in personal income than alternative A.

Table H.20. Local economic impacts of refuge related purchases for Alternative C (2006$).

	Local output	Personal income	Employment (# jobs)
Direct effects	$119,900	$35,200	1.5
Secondary effects	$37,200	$11,800	0.5
Total economic impact	$157,100	$47,000	2

Summary of Economic Impacts for Alternative C

Table H.21 summarizes the direct and total economic impacts of all refuge management activities for alternative C in Tucker County and the city of Elkins. Under alternative C, refuge management activities directly related to all refuge operations generate an estimated $1.93 million in local output, 18.4 jobs and $405,500 in personal income in the local economy. Including direct, indirect, and induced effects, all refuge activities would generate total economic impacts of $2.32 million in local output, 24.6 jobs and $523,200 in personal income. Total economic impacts associated with refuge operations under alternative C represent less than one percent of total income (0.1%) and total employment (0.3%) in the overall Tucker County and the city of Elkins economy. Total economic effects of refuge operations play a much larger role in the Canaan Valley communities near the refuge such as Davis, Thomas and Parsons where most of the refuge public use-related economic activity occurs.

Table H.21. Summary of all refuge management activities for Alternative C (2006$).

	Local output	Personal income	Employment (# jobs)
Refuge Revenue Sharing			
Direct effects	$85,300	$28,400	1
Total effects	$103,100	$33,900	1.2
Refuge administration (staff salary spending and work related purchases)			
Direct effects	$674,500	$126,600	5.5
Total effects	$805,800	$167,600	7.4
Public use activities			
Direct effects	$1,168,100	$250,500	11.9
Total effects	$1,406,200	$321,800	16.0
Aggregate impacts			
Direct effects	$1,927,900	$405,500	18.4
Total effects	$2,315,100	$523,200	24.6

Table H.22 summarizes the change in economic effects associated with refuge operations under alternative C as compared to alternative A. Due to increases in refuge administration and visitation, alternative C would generate $367,300 more in local output, 3.7 additional jobs and $80,600 more in personal income as compared to alternative A.

Table H.22. Change in economic impacts under Alternative C compared to Alternative A (2006$).

	Local output	Personal income	Employment (# jobs)
Refuge Revenue Sharing			
Direct effects	$0	$0	0
Total effects	$0	$)	0
Refuge Administration (staff salary spending and work related purchases)			
Direct effects	+$199,300	+$38,800	+1.7
Total effects	+$239,600	+$51,400	+2.3
Public use activities			
Direct effects	+$106,100	+$22,800	+1.1
Total effects	+$127,700	+$29,200	+1.4
Aggregate impacts			
Direct effects	+$305,400	+$61,600	+2.8
Total effects	+$36,.300	+$80,600	+3.7

Economic Impacts of Alternative D

Impacts from Refuge Revenue Sharing

Same as alternative A.

Impacts from Refuge Administration

Staff – Personal Purchases

Proposed staff for alternative D includes all approved staff positions (alternative A, Table H.7) plus two additional positions. The new positions are for a permanent Seasonal Maintenance worker and an additional Law Enforcement Officer. Table H.23 shows the economic impacts associated with spending of salaries in Tucker County and the city of Elkins by refuge employees under alternative D. For alternative D, salary spending by refuge personnel would directly account for $454,000 in local output, 3.2 jobs, and $74,800 in personal income in the local economy. The secondary or multiplier effects would generate an additional $77,100 in local output, 1.2 jobs, and $23,900 in personal income. Accounting for both the direct and secondary effects, salary spending by refuge personnel for alternative D would generate total economic impacts of over $531,100 in local output, 4.4 jobs and $98,700 in personal income. Due to the increased staffing levels for alternative D, the associated economic effects of staff salary spending would generate $59,800 more in local output, half a job, and $10,900 more in personal income than alternative A.

Table H.23. Local economic impacts of salary spending by refuge personnel for Alternative D (2006$).

	Local output	Personal income	Employment (# jobs)
Direct effects	$454,000	$74,800	3.2
Secondary effects	$77,100	$23,900	1.2
Total economic impact	$531,100	$98,700	4.4

Work-related Purchases

Same as alternative A.

Impacts from Public Use and Access Management

Refuge Visitor Expenditures in Local Economy

Same as alternative A.

Summary of Economic Impacts for Alternative D

Table H.24 summarizes the direct and total economic impacts of all refuge management activities for alternative D in Tucker County and the city of Elkins. Under alternative D, refuge management activities directly related to all refuge operations generate an estimated $1.67 million in local output, 15.9 jobs and $352,300 in personal income in the local economy. Including direct, indirect, and induced effects, all refuge activities would generate total economic impacts of $2.01 million in local output, 21.4 jobs and $453,600 in personal income. Total economic impacts associated with refuge operations under alternative D represent less than one percent of total income (0.1%) and total employment (0.2%) in the overall Tucker County and the city of Elkins economy. Total economic effects of refuge operations play a much larger role in the Canaan Valley communities near the refuge such as Davis, Thomas and Parsons where most of the refuge public use-related economic activity occurs.

Table H.24. Summary of all refuge management activities for Alternative D (2006$).

	Local output	Personal income	Employment (# jobs)
Refuge Revenue Sharing			
Direct effects	$85,300	$28,400	1
Total effects	$103,100	$33,900	1.2
Refuge administration (staff salary spending and work related purchases)			
Direct effects	$526,500	$96,100	4.1
Total effects	$626,000	$127,00	5.6
Public use activities			
Direct effects	$1,062,000	$227,700	10.8
Total effects	$1,278,500	$292,600	14.6
Aggregate impacts			
Direct effects	$1,673,800	$352,300	15.9
Total effects	$2,007,600	$453,600	21.4

Table H.25 summarizes the change in economic effects associated with refuge operations under alternative D as compared to alternative A. Due to increases in refuge administration; alternative D would generate $59,800 more in local output, half of an additional job and $10,900 more in personal income as compared to alternative A.

Table H.25. Change in economic impacts under Alternative D compared to Alternative A (2006$).

	Local output	Personal income	Employment (# jobs)
Refuge Revenue Sharing			
Direct effects	$0	$0	0
Total effects	$0	$0	0
Refuge Administration (staff salary spending and work related purchases)			
Direct effects	+$51,300	+$8,300	0.3
Total effects	+$59,800	+$10,900	0.5
Public use activities			
Direct effects	$0	$0	0
Total effects	$0	$0	0
Aggregate impacts			
Direct effects	+$51,300	+$8,300	0.3
Total effects	+$59,800	+$10,900	0.5

Summary and Conclusions

Under alternative A, refuge management activities directly related to all refuge operations generate an estimated $1.62 million in local output, 15.6 jobs and $344,000 in personal income in the local economy (Table H.10). Including direct, indirect, and induced effects, all refuge activities would generate total economic impacts of $1.95 million in local output, 20.9 jobs and $442,700 in personal income. Total economic impacts associated with refuge operations across all alternatives represent less than one percent of total income and total employment in the overall Tucker County and the city of Elkins economy. Total economic effects of refuge operations play a much larger role in the Canaan Valley communities near the refuge such as Davis, Thomas and Parsons where most of the refuge public use-related economic activity occurs.

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